M/027/030

State of Utah

DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY

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April 22, 1992

Mr. Elliott W. Lips
JBR Consultants Group
8160 South Highland Drive, Suite A-4
Sandy, UT 84093

RE: Proposed Topaz Beryllium Venture
Facility Plan Comments

Dear Mr. Lips:

On February 26, 1992 Messrs. Robert Prescott and Victor Kastner of Inspiration Gold, Inc.; Bob Baer, Brian Buck, and yourself of JBR Consultants; Kiran Bhayani, Larry Mize, Dave Rupp and Mark Novak of the Division of Water Quality; met to discuss the Topaz Beryllium Venture Facility plan. This letter is sent in response to our meeting of February 26, 1992, and subsequent conversations.

Ground Water Protection Levels

It is of primary importance to establish the requirements for the wastewater and spent ore cells. This can only be begun by determination of the ground water protection level(s). Your installation and monitoring of upgradient wells is needed for this, as well as the raffinate and spent ore rinsate compositions.

Preliminary information indicates that ground water under the site is quite variable, in part due to the flowing well near the site. Ground water quality at any one point is also likely to change over time. Because of these complications it may not be possible to assign one ground water class for the entire site. Ground water protection levels, then, will be determined by an ongoing review of background ground water quality during the life of the permit. Protection levels may change if the class determination at an upgradient monitor well changes. As a conservative approach, Topaz Beryllium should design its facilities to achieve the protection levels for the best quality ground water expected to exist on or upgradient of the site.

Leach Pads and Process Ponds

The revised configurations, for the pads and ponds, proposed in the meeting, (copies attached) are adequate to proceed to a preliminary design. For the leach pad, you should evaluate the stability of the base and sub-base material to support the pavement structure, which will have heavy equipment and ore loads. Adjustment of depths, and materials may be required. The leak detection media should have a hydraulic conductivity of $1x10^{-1}$ cm/second or more. The capillary rise value for the media should be less than 12 inches. The gravel in the pond sump should be enveloped by a geotextile for protecting the HDPE liners.

Spent Ore Disposal Cell

Disposal of spent ore in the manner proposed in the application will not be protective of ground water and is not permissible. Either neutralization of the ore or better containment of leachate resulting from infiltrating precipitation or some combination of both are needed to insure ground water protection levels are met. If there is a possibility that the chosen plan may allow a discharge to ground water, monitoring wells will be necessary to show that protection levels are being met.

If each spent ore type is neutralized, and it is shown in the laboratory that a statistically adequate number of samples all show the rinsate meets the ground water protection levels prior to placement in the disposal cell, then the disposal method proposed in the ground water permit application would be acceptable. This type of disposal cell would still need ground water monitoring, unless laboratory testing shows there would be no "rebound" effect over time as contaminants diffuse out of the ore particles. Under any other conditions, the lining of this cell as proposed, which consists of a 1-foot deep cut of the native surface clay, and a 3-foot minimum in-place native clay, will probably need to be changed. The exact configuration of the lower liner will depend on the chemical characteristics of the rinsate, which at this time is not known, but is essential to finalize the design. Interim operational and final covers will also need to be designed to exclude infiltrating precipitation.

Wastewater Lagoon

Because Topaz Beryllium has not yet supplied information on the expected composition of wastewater to be discharged to the lagoon, comments on the design cannot be extended in significant detail at this time. The proposal to use in-place soils as a clay liner for the waste raffinate impoundment in general would not represent BAT for containment of wastewater which will likely have low pH and dissolved metals. For example, an engineered earthen-lined pond would be acceptable only if the wastewater's pH was brought up to 6.5, in conformity with the Utah ground water quality standards.

We cannot accept that the native in-place materials under the pond site are continuous and free of defects which may lead to leakage of the wastewater into underlying aquifers. Realistically, no investigation would be thorough enough to demonstrate that native in-place soils could be used as the lagoon's primary liner. If an earthen liner is feasible at this site because of favorable site characteristics and compatible wastewater chemistry, native soils could be used to construct an engineered liner. Under these conditions, proper construction procedures and a QA/QC testing program must be used to demonstrate that the appropriate hydraulic conductivity is achieved over the entire lagoon site. Also, before we can approve this type of design, the company must make a theoretical demonstration that the seepage from the lagoon will not cause an exceedance of ground water protection levels, taking into account known site characteristics, liner design and wastewater chemistry. The liner must not be damaged by contact with the wastewater.

As part of the ground water discharge permit application, the company must develop compliance monitoring plan, contingency plans and closure plans for all of the facilities covered by the permit. If an earthen-lined lagoon design is chosen, these plans will be the primary means of demonstrating that the lagoon is in compliance with the regulations. Accordingly, requirements for these plans will be more strict for an earthen-lined pond design than they would be for a more conservative design. Where appropriate, these requirements may also apply to other permitted facilities at this site as well.

The company must develop a compliance monitoring plan appropriate to the site conditions which will effectively monitor lagoon performance. The justification for this plan must take into account the hydraulic gradients and potential migration pathways under the site and should monitor the ground water most likely to be affected by the lagoon. A justification should also be made for the locations of monitor wells and spacing between them, considering the site-specific hydrogeologic characteristics. Monitoring parameters will be assigned based on chemistry of the raffinate and background ground water chemistry.

In the event that operation of the lagoon causes exceedance of ground water protection levels, a contingency plan to bring the facility into compliance must be developed. This plan should include an immediate cessation of the discharge, if an exceedance of protection levels is confirmed, and a statement of what steps the company would take to contain and remediate the released contaminants.

Use of a lagoon of this design could cause the formation of a mass of clay soils contaminated by exposure to the raffinate. As part of the ground water discharge permit application a closure plan should be devised which states how the company will prevent migration of these contaminants into ground water after closure of the lagoon. This plan should include a study to delineate the extent of the contaminated clay after closure. Depending on the extent of contaminants after closure and other site-specific factors, post-closure ground water monitoring may be required to insure that protection levels are not exceeded.

Topaz Beryllium should carefully evaluate the costs and potential liabilities which will be involved in using a lagoon of this design. Pretreatment of wastewater prior to discharge, waste minimization, water recycling or better containment technology may provide cost-effective alternatives to the proposed wastewater disposal method.

Please contact Messrs. Mark Novak or Dave Rupp regarding any questions.

Sincerely,

Don A. Ostler, P.E.
Director

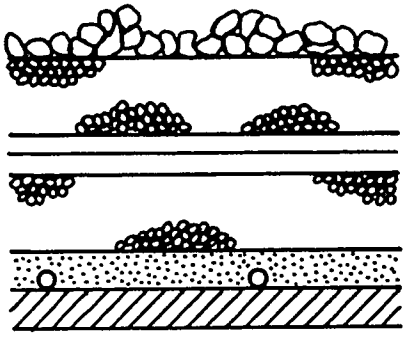
MN:DR:rvg

cc: Mr. Robert Prescott, Inspiration Gold, Inc.
Mr. Wayne Hedberg, Div. of Oil, Gas, and Mining
Mr. Roger Foisy, District Engineer

N:TOPBERYL.INF
FILE: TOPAZ BERYLLIUM VENTURE

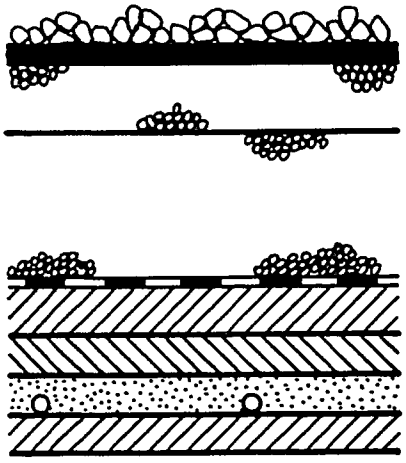
LEACH PAD DESIGN

OLD PAD



ORE
12" OVERLINER
3" ASPHALT
3" ASPHALT
12" BASE
6" SAND LEAK DETECTION
6" CLAY 10^{-6} cm/sec

NEW PAD



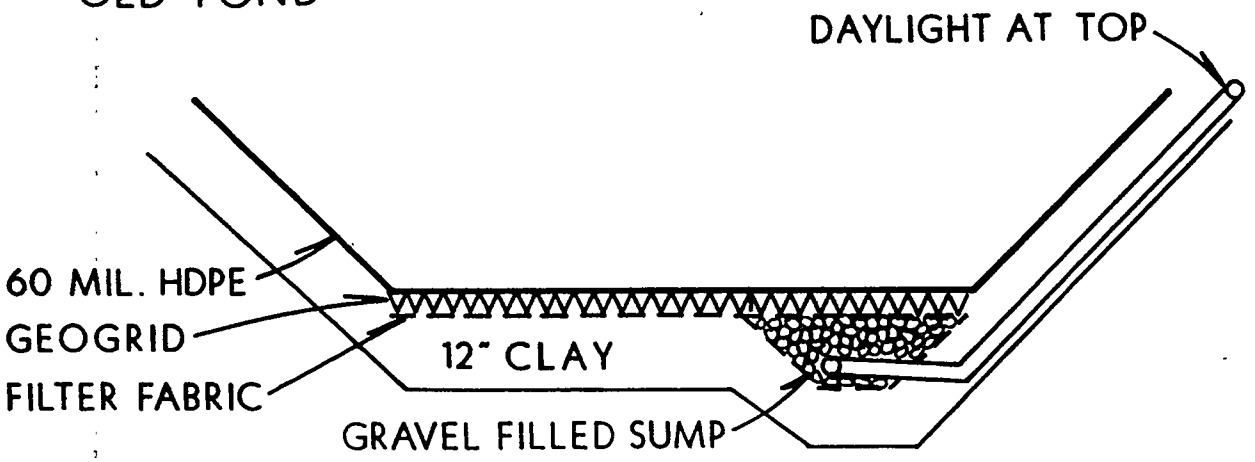
ORE
3" ASPHALT
12" BASE COURSE

24" SUB-BASE

60 MIL HDPE
6" CLAY 10^{-7} cm/sec
6" SUB-BASE
6" SAND LEAK DETECTION
6" CLAY 10^{-7} cm/sec

SOLUTION POND DESIGN

OLD POND



NEW POND